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ABSTRACT

A group of 767 children in Finland were studied over their first six years in school to discover what kind of variation there is in school readiness, what kind of development takes place in these variables during the basic school period, what relationship exists between these variables, to what extent heredity explains the differences, how far the differences depend on structural factors, and how far the variables can be explained by process variables. The children came from four northern and two southern communities, three rural and three urban. They were tested for intelligence, initial reading and mathematical abilities, social status, physical growth, and achievement and personality. Among the results were the following: intelligence and cognitive attainment correlated highly; clear differences in all the basic variables showed up, generally favoring the urban and southern districts; children in the rural northern areas gained most in reading skills, intelligence, and mathematical skills; intelligence was connected with literacy skills from the beginning; by the sixth grade, good readers were less neurotic and social; and the children in the northern areas who started behind the other children caught up by the end of the sixth grade. (TJ)

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# Development of reading skill during primary school period in Finland

Summary

A follow-up study concerning pupils' development in literacy skills (the three R's) was arranged in the University of Oulu in 1970. The investigation was combined with the school reform movement and aimed to clarify the problems of the influence of different environments on school attainments. The theory of interaction between heredity and environment served as a background to the investigation. A sample of six communities with about 750 pupils was taken from northern and southern parts of Finland. The main variables measured were two intelligence tests (Raven and KTK), initial reading and mathematics tests; later some other achievement and personality tests, attitude measurements and questionnaires were used.

The main results indicated that the children in remote rural areas in the North represented a lower stage of development in all measured aspects at the starting point. Pupils' development in intelligence and literacy skills showed, however, that children in rural communities in the north gradually caught up with their coevals in other areas. Even more, when test means were corrected by regression coefficient they had gained most in these skills during the elementary school period. The new school system had in particular raised the standard of weak pupils. The variables most connected with attainments in literacy skills were intelligence and motivational influence of home and environment in general.

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# Development of reading skill during primary school period in Finland

## 1. Background

A follow-up study concerning pupils' development in literacy skills (the three R's) was arranged in the University of Oulu in 1970. The aim was to follow pupils' development in these skills during the basic school period (ages 7-15) and examine its ralationship to certain environmental factors. Very little information was available on this matter in Finland. It was considered important to gather such knowledge because a new school organization was to begin in 1972 and the aim was to place more importance on the literacy skills. School reform was combined with prevailing democratisation and equality movements in education. Instead of the old parallel school system all children would study together throughout the 9-year period. This raised many problems especially in the basic skills, languages and mathematics; curriculum, teaching methods, teaching materials, teacher training would have to be planned in a new way. Because the school reform had been decided on a political basis such questions as childrens' abilities, different motives, interests and personality aspects on the one hand and varied environmental factors on the other did not play such an important role at that time. But these are questions which hold greater interest for educational research workers both from the theoretical as well as the practical point of view. The investigation mentioned above and called the PSK-study was based on these aspects.

## 2. Theoretical foundation

The basic problems of this study concern the influence of different environments on school attainments. Hereditary factors are of course always involved in development and the theory of interaction of both these factors is accepted as an explanation of all human achievements and behavior (Mussen et al. 1973, 29). Teachers and administrators usually put the main emphasis on environmental procedures which help to attain accepted goals. It is, however, also clear that hereditary factors must be taken into account, although at present we cannot be sure of their proportional influence (cf. e.g. Jensen and Eycenck versus Husén and Jencks). The interaction between heredity and environment is illustrated in Fig. 1. The broad theory of interaction needs, however, specification when we pass to a practical level, e.g. to study variation of school achievements. The matter is shown schematically in Fig. 2. The PSK-study is comparative by nature in that pupils from opposite areas, northern - southern and urban - rural in Finland are compared. The educational goals in the Finnish school system are everywhere very similar, we can perhaps say identical. Therefore the factors having most influence on attainments belong to the group of frame and process variables (if we suppose that the hereditary factors are approximately the same in all areas). The frame factors in particular differ greatly in many milieus, not only when school and home but also when such larger environmental factors as climatological, demographic, ecological and social ones are in question. School attainments depend largely on pupils' characteristics and on the guidance given at school and are thus important sources of variance. These intervenient variables caused most problems in the strategy of investigation and sample technique used (cf. e.g. Keeves 1972, 39-).

The specific problems of the study were formulated as follows:
1) What kind of variation is there in school readiness (physical and psychological) in the sample groups?
2) What kind of development takes place in these variables during the basic school period?

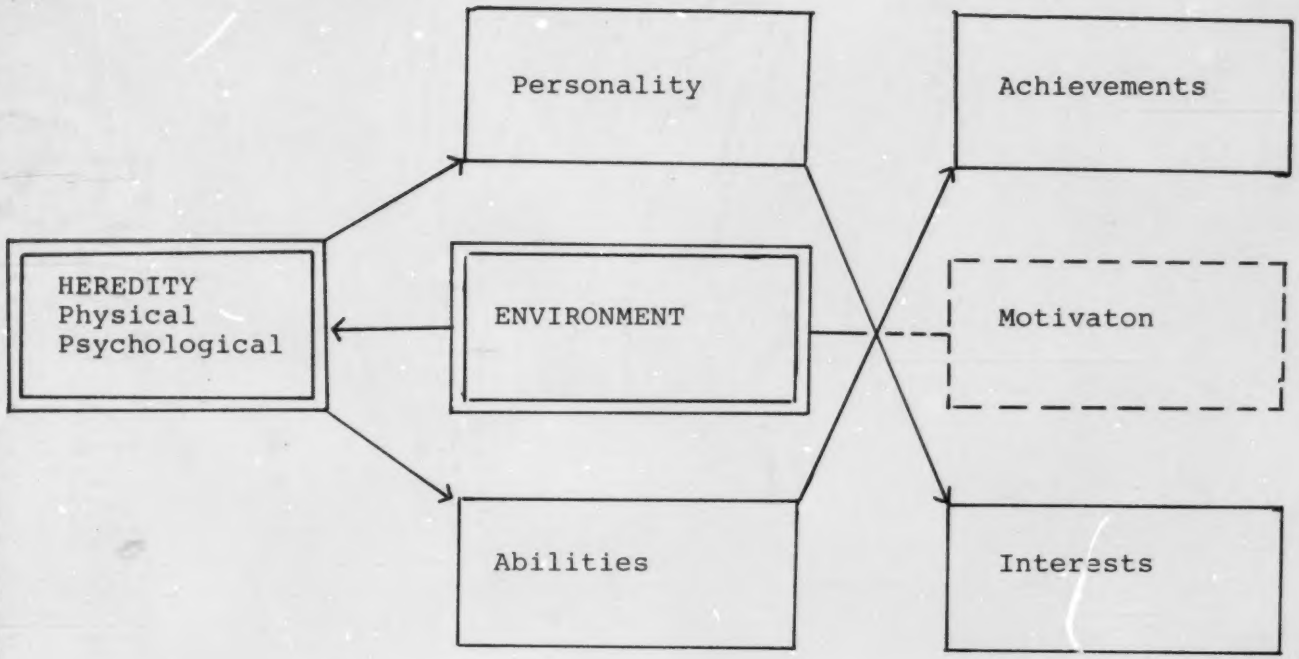


Fig. 1. Interaction between heredity and environment

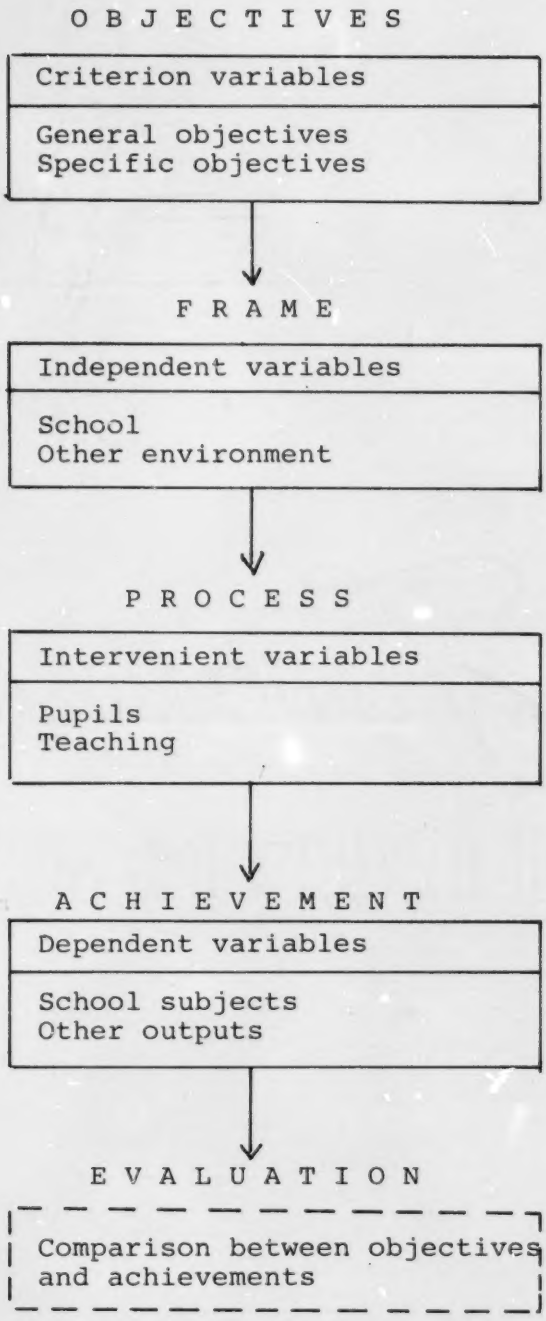


Fig. 2. Theoretical model of the PSK-investigation

3) To what extent does a relationship exist between these variables?
4) To what extent do hereditary factors (intelligence, personality) explain differences?
5) How far are differences dependent on structural factors?
6) How far could variation be explained by process variables?

A sample of four communities (two urban + two rural) was taken from the northern part of Finland and as a control a sample of two communities (one urban + one rural) from the southern part of the country. From each community a whole age cohort (entering school in 1970) was included and measured periodically. The number of children was 767 at the start and after the six year period 597.

The main measured variables at the start were as follows: Raven' PMs + KTK non-verbal test of intelligence, initial reading test (IR), initial mathematics test (IM), social status, medical examination of which only physical growth (height and weight) will be presented here. Later some other achievement and personality tests, attitude measurements and questionnaires were used. The main emphasis in the following will be upon the presentation of the development of literacy skills, reading and mathematics (for more about the design, see Kyöstiö 1977).

## 3. Results

The clarification of the starting point is essential to all follow-up studies. In this case it means that all pupils were measured in the above-mentioned basic variables individually. The PSK-investigation started at the point children commenced school at the age of 7. It would have been useful to obtain some information about children's earlier life history before school but this was not possible owing to the limited resources. Because the aims of the study are mainly descriptive the statistical calculations seek only to compare means, SDs, proportions and correlations and their significance between groups.

a) Sample at the starting point

If we consider the entire development of children the measurements at the starting point were very limited. Height and weight in a way indicate physical heredity and intelligence (Raven) psychological heredity. Initial tests in reading and mathematics show attainments influenced by environment. Status of parents is the most important social factor. Table 1 shows the situation of the whole sample in these variables.

The means in Table 1 are as such not interesting without comparison. Physical status is normal according to Finnish norms. The mean in Raven's PMs is slightly higher than English norms ($P<05$). The correlation between Raven and KTK-test was .58 and between Frostig .46 (both in subsamples). Girls were significantly ($P<001$) better in both attainments though there was no statistical difference in intelligence (boys were slightly better in Raven's PMs and girls in drawing memory test, in the third class no difference and in the sixth class girls slightly better in Raven). That girls are better at reading has been demonstrated in many other investigations (e.g. Malmqvist 1961, 108, Dykstra and Tinney in Figurel 1969) but not so often in mathematics.

More interesting than means are, from the general point of view, the correlations in Table 1. The relationship of physical status can be disregarded in this connection. Intelligence and cognitive attainment usually correlate rather highly with each other, even for school beginners (Deaborn & Anderson 1952, 81; Malmqvist 1961, 141). In this case the relationship is not so high as usual, especially in reading. This is probably a result of sample characteristics: children in remote areas do not have such strong supportive incentives at home.

Comparisons between communities show clear differences in all basic variables, mostly in favour of urban and southern districts: school beginners there are more physically developed, more test-intelligent and have more knowledge in the literacy skills. The variation in each subgroup is, however, great and the first class teacher must bear this in mind.

Table 1. Means, SDs and correlation coefficients of the basic variables in the PSK-investigation

| | | | | | Boys | | Girls | |
|---|---|---|---|---|---|---|---|---|
| | | N | M | SD | M | SD | M | SD |
| X2 | Intelligence (Raven) | 754 | 17.4 | 4.3 | 17.7 | 4.5 xxx | 17.3 | 4.9 |
| X7 | Reading | 767 | 56.1 | 27.4 | 50.1 | 27.3 | 62.2 | 26.6 |
| X9 | Mathematics | 758 | 37.1 | 11.5 | 35.5 | 12.0 xxx | 38.6 | 11.2 |
| X63 | Father's Occup. | 605 | 2.87 | .83 | | | | |
| X66 | Mother's Education | 651 | 1.87 | 1.07 | | | | |
| | Physical Development | | | | | | | |
| X155 | Height, Boys | 363 | 122.6 | 5.3 | | | | |
| | " , Girls | 363 | 121.6 | 6.1 | | | | |
| X156 | Weight, Boys | 363 | 24.1 | 3.8 | | | | |
| | " , Girls | 363 | 23.4 | 4.2 | | | | |

Correlation coefficients

| | | X2 | X7 | X9 | X63 | X66 | X155 B | X155 G | X156 B | X156 G |
|---|---|---|---|---|---|---|---|---|---|---|
| X2 | | - | .288 | .450 | -.177 | .216 | | | | |
| X7 | | .288 | - | .646 | -.122 | .159 | | | | |
| X9 | | .450 | .646 | - | -.158 | .153 | | | | |
| X63 | | -.177 | -.122 | -.158 | - | -.500 | | | | |
| X66 | | .216 | .159 | .153 | -.500 | - | | | | |
| X155 | B | .052 | .094 | .166 | -.102 | .009 | | | .734 | |
| | G | .049 | .049 | .144 | -.059 | .024 | | | | .753 |
| X156 | B | .062 | .070 | .135 | -.024 | .061 | | | | |
| | G | .058 | .025 | .146 | -.028 | .058 | | | | |

b) Development in literacy skills

It would be approbriate first to say something about the development of intelligence during the 6-year period because this has most influence on attainments in reading. At the end of the period the means in Raven's PMs do not show any difference in intelligence except for the urban centre in the South. If we examine carefully the means, especially those corrected by the analysis of covariance, we see that children in rural districts in the North have gained most, the northern towns in an average manner, the Southern rural district least, and the Southern town most. Is this change a result of school influence? One must be careful in framing this conclusion because drop-out cases were numerous and did not affect the communities in the same way. The correlations (.40 ... .60) between consecutive measurements were not as high as e.g. Bailey (.70 ... .90) obtained at this age period (Bloom 1964, 57) either. They may be a warning that our intelligent measurement was less reliable.

Table 2 shows the results of reading test at the starting point and in three later measurements. The means of the initial test are low in the north, except at K(emijärvi), an urban centre which in the preinvestigation, however, only had a mean of 53.3 (which is similar to other northern communities). Here again the corrected means show that the Northern rural areas have advanced proportionally most in reading skill as in intelligence and the two communities which were at the top at the initial stage have gained least. It seems in the light of this investigation that the new basic school has had a smoothing effect on the development of literacy skills. The results in mathematics test show precisely the same tendency.

According to the new education act the school must give extra instruction to those pupils whose success in reading and mathematics is bad. Efforts made in the field of special education have likewise raised the level of weak pupils. As an example we can mention that the number of special education teachers whose task it is to help with speech, reading and writing difficulties has increased from about a hundred to a thousand during this decade. The variation in attainments is still large

Table 2. Original and corrected reading results in 1st, 3rd and 6th grade in sample communities, using analysis of covariance in eliminating differences at start (N = 486)

| Community | N | Level at start | 1. grade | | 3. grade | | 6. grade | |
|---|---|---|---|---|---|---|---|---|
| | | | Mo | Mc | Mo | Mc | Mo | Mc |
| (NR) P | 34 | 47.7 | 21.0 | 23.1 | 30.4 | 31.8 | 12.0 | 13.2 |
| (NU) K | 83 | 61.9 | 26.4 | 25.7 | 35.3 | 34.8 | 12.4 | 11.3 |
| (NR) H | 102 | 52.9 | 20.9 | 22.0 | 29.0 | 29.7 | 11.9 | 12.5 |
| (NU) R | 97 | 56.0 | 25.2 | 25.6 | 34.3 | 34.6 | 12.2 | 12.4 |
| (SR) E | 89 | 65.1 | 25.0 | 24.4 | 34.8 | 33.9 | 12.0 | 11.2 |
| (SU) L | 81 | 59.2 | 26.4 | 26.2 | 35.1 | 35.0 | 12.3 | 12.2 |
| Total | 486 | 58.2 | | | | | | |
| F | | | 6.24 | 53.0 | 9.67 | 29.2 | 1.16 | 3.74 |
| P | | | <.001 | <.001 | <.001 | <.001 | <.10 | <.01 |

Mi = level at start, i = 1, ...6 (communities)
Mo = original mean
Mc = corrected mean

correction formula:

1. grade: $Mc_i$ = Mo -.20 (Mi -58.2)
3. grade: $Mc_i$ = Mo -.13 (Mi -58.2)
6. grade: $Mc_i$ = Mo -.11 (Mi -58.2)



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and more efforts could be made for handicapped children. But there are educators who have expressed the opinion that the school neglects gifted children and the development of other characteristics than the cognitive ones, especially children's artistic abilities. The problem thus becomes very complicated and is combined with many value and ideological questions which cannot be solved through positivistic research studies alone. But whether a political majority decision is the right solution in educational matters like this certainly needs critical consideration.

c) Connexion of reading with other variables

As was shown already in Table 1 intelligence was connected with literacy skills from the very beginning. The correlation with reading was not so high, however, as might be expected on the basis of many other investigations. If the child does not get incentives for reading at home or elsewhere he hardly learns to read even though he may be intelligent. On the other hand children who are less able, but still normal, and live in an environment rich in positive stimuli can learn reading up to the age of 7 before coming to school. In the sample this was revealed in the fact that about 20 % of children belonging to the lowest quartile in intelligence (Raven) got the point value of the highest quartile in the initial reading test (comp. with 60 % of the highest IQ). Their share did not diminish to a noteworthy degree toward the end of school, in other words, originally good readers remained so in spite of their intelligence. Raven's PMs are probably not the best indicator of reading ability but their moderate correlations e.g. with the ITPA-test show that they can be used as a prognostic medium in estimating reading ability.

The influence of intelligence was also investigated in the opposite direction, by grouping the children into quartiles on the basis of their attainments in reading in the sixth class. When their intelligence was checked in the light of the first

grade measurement the difference between the $Q_1$ and $Q_4$ (M 15.9~18.7) was highly significant (P<001), as also in the 3. and 6. grade. Thus children who are good readers in the sixth class, are on average, the most intelligent throughout the school. The ability grouping was the same according to the KTK-test and to factor tests on ability in the 1., 2., 3. and 6. grade. The quartile distribution of sixth grade reading was in high correspondence (P<001) with the initial reading results at the time the children entered school and with the achievement tests later in grades 1, 2, 3, and 6. On general feature of good readers throughout the school was their richer vocabulary, which had a significant connection with many background (climatological, demografic and ecological) variables (Vaherva 1974, 89).

At the end of second grade the personality of pupils was measured and the results showed that good readers were more feminine anxious, submissive but less self-confident and disturbed and had a positive attitude to school. In the sixth grade Eysenck's JEPI-scale was used for the same grouping. Good readers were less neurotic and social. There were no differences in the other dimensions.

What are the reasons that the group of less intelligent children but good readers from the start could maintain their standard? One explanation is of course that their intelligence was still normal (between IQ 85-100) and they had good personality characteristics, in particular a positive attitude to learning. Their mothers had also estimated their concentration and learning abilities well. The status of homes was above the average of the whole sample, and what was probably more important, their mothers' and fathers' education was significantly higher than the mean, though not so high as the mean of the rest of the good readers ($Q_4$). Most of this "controversial" group of good readers were girls living in population centres and in the South where environmental stimuli are richer.

4. Discussion

PSK-investigation is still under way. Not all the materials collected up to now have been computerized yet. So that definitive answers to the problems set at the beginning cannot be given. Development of reading is one of the essential focuses of the study. It has been shown that there is a great variation in literacy skills of children at the moment they enter school both between and within the sample communities. First grade teachers and teacher educators do not pay enough attention to this fact, which is central from the point of view of individual learning and development in general. Its importance is still more remarkable in countries where obligatory schooling commences as late as at the age of 7.

We can also point to some reasons which cause this early variation. Hereditary factors, intelligence and personality, constitute a basis for all learning. It is therefore useful for the teacher to gather, in one way or another (through tests, observation, interviews etc.) knowledge of her pupils' characteristics and keep some kind of records of this information. The need for individualized instruction does not come only from hereditary factors but also from environmental influences in which there was also great variation in the sample communities. Specific skills such as literacy ones arise from incentives given by childrens' environment. Some ecological, economic and social factors have long hampered many children in receiving positive stimuli in their childhood. But these have largely disappeared in developed countries with the help of the welfare state. The near milieu, home and neighborhood probably causes most variation in the development of children at present and will probably continue to do so in the future. Society can of course balance out these differences through effective information, social policy and institutionalization of children as early as possible. This is, however, a question on which people's opinions differ very greatly. Socialistic countries have chosen a uniform levelling on the one hand and an early

differentiation of talented children on the other. Other countries allow more freedom to families to arrange childhood education in their own way. This solution causes more environmental variation and challenges to a school when the children enter it.

The development of literacy skills from the beginning of school continuously indicates variation between and within communities. The results show, however, that children in remote areas make up quite a lot of the original gap e.g. in reading. The Finnish comprehensive school puts great emphasis in particular on the development of weak pupils. To what extent this takes place at the cost of other students is still an open question. The education in primary grades is apparently in many respects (curriculum, teaching methods and materials) at a higher level now than during the old parallel system. Some research studies demonstrate, however, that skill in reading still leaves plenty of room for improvement (Vähäpassi 1977).

The connexions of reading with background variables point later in the same direction as at the start of school: large global variables favour the southern and urban centres. Their influence is, however, mostly indirect through intervening variables. The low correlation of school variables (standard of buildings and equipment, teacher competence, number of pupils etc.) with background ones show, however, that the remote areas do not represent a lower equipment standard than the bigger schools in centres. The group of home variables also correlate positively with school attainments. It is interesting to note that initial reading has not such a high correlation with later attainments as intelligence and initial test of mathematics have. This result does not, however, diminish the importance of reading in all learning.

References

Becker, W.C., Teaching reading and language to the disadvantaged. Harvard Ed.Rev., Vol. 47, 4/1977, 518-543

Bloom, B.S., Stability and Change in Human Characteristics. New York, Wiley, 1964

Dykstra, R. and Tinney, R., Sex differences in reading readiness, in J.A. Figurel (ed.), Reading and Realism. Newark, Del, IRA, 1969

Husén, T., Social Influences on Educational Attainment. Paris OECD, 1975

Keeves, J.P., Educational Environment and Student Achievement. Stockholm, AUS 20, 1972

Kyöstiö, O.K., Lapsi ja ympäristö I. Oulu, Institute of Behavioral Sciences 32, 1977, (Summary: The child and his environment)

Malmqvist, F., A decade of reading research in Europe. Journal Ed.Res., Vol. 63 7/1970, 309-329

Vaherva, T., Koulutuotokset peruskoulun ala-asteella yhteisömuuttujien selittäminä. Jyväskylä, Jyväskylä Studies in Education 27, 1974, (Summary: Educational outcomes at the lower level on the comprehensive school in the light of ecological variables, Diss.)

Vähäpassi, A., Lukutaidon rakenteesta ja vaihtelusta peruskoulun kolmannella luokalla lukuvuonna 1973-74. Jyväskylä, KTL 283/1977, (Summary: On the structure and variability of reading skill in grade 3 of the comprehensive school in school year 1973-74)